

IN THE CLAIMS:

The following is a complete listing of the claims, and replaces all earlier listings and versions:

1-11. (Cancelled)

12. (Currently Amended) An optical line terminal, comprising:

a line interface having a line side transmit port ~~for transmitting to~~ transmit an optical signal and a line side ~~receiver receive~~ port ~~for receiving to receive~~ an optical signal;

a port side interface having a port side transmit port ~~for transmitting to transmit~~ an optical signal and a port side receive port ~~for receiving to receive~~ an optical signal; and

a transponder connected to the line side transmit port and the line side receive port of ~~[[said]]~~ the line side interface, and also connected to the port side transmit port and port side receive port of ~~[[said]]~~ the port side interface, ~~[[said]]~~ the transponder including a loopback mechanism ~~[[for]]~~ to perform at least one of looping back ~~[[the]]~~ a received optical signal at the line side receive port to the line side transmit port and looping back ~~[[the]]~~ a received optical signal at the port side receive port to the port side transmit port, without converting any received optical signal to electrical form during looping back.

13. (Currently Amended) An optical node interconnected in an optical communication system having the optical node and plural other optical nodes, the optical node comprising:

~~a line side transmit interface for transmitting one or more of a plurality of optical wavelengths;~~

~~an associated~~ a line side receive interface for receiving to receive one or more of a plurality of optical wavelengths including a test optical wavelength, from one of the other nodes that originated the test optical wavelength; [[and]]

a line side transmit interface to transmit one or more of the plurality of optical wavelengths, including the test optical wavelength; and

a loopback mechanism [[for]] to perform looping back of the one or more of the plurality of optical wavelengths, including the test optical wavelength, received at [[said]] the line side receive interface to the line side transmit interface without converting the optical wavelengths to electrical form.

14. (Currently Amended) An optical node comprising:

a first optical line terminal having an all-optical-pass-through port side interface including a plurality of port side transmit ports, each ~~for transmitting to transmit~~ a different one of a plurality of optical wavelengths, and a plurality of associated port side receive ports, each ~~for receiving to receive~~ the different one of the plurality of optical wavelengths, [[said]] the first optical line terminal including at least one

transponder connected to a predetermined one of [[said]] the transmit ports and also connected to the associated one of [[said]] the port side receive ports, the one transponder including a loopback mechanism [[for]] to perform looping back of the received optical wavelength at the associated one of [[said]] the port side receive ports to the predetermined one of [[said]] the port side transmit ports;

a second optical line terminal having an all-optical-pass-through port side interface including a plurality of port side transmit ports, each ~~for transmitting to~~ transmit a different one of the plurality of optical wavelengths, and a plurality of associated port side receive ports, each ~~for receiving to receive~~ the different one of the plurality of optical wavelengths, [[said]] the second optical line terminal including at least one transponder connected to a predetermined one of [[said]] the port side transmit ports and also connected to the associated one of [[said]] the port side receive ports, the one transponder including a loopback mechanism ~~for~~ to perform looping back of the received optical wavelength at the associated one of [[said]] the port side receive ports to the predetermined one of [[said]] the port side transmit ports; and

an optical connection, [[for]] optically connecting at least one of the port side transmit ports of [[said]] the first optical line terminal to at least one of the port side receive ports of [[said]] the second optical line terminal, and [[for]] connecting the associated port side receive port of [[said]] the first optical line terminal to the associated transmit port of the second optical line terminal.

15. (Currently Amended) An optical network comprising:

n, where n is an integer, optical nodes, including a source node ~~for providing to provide~~ an optical signal that includes a test optical signal, and a destination node ~~for receiving to receive~~ the optical signal that includes the test optical signal;

optical fibers ~~[[for]]~~ optically connecting ~~[[said]]~~ the n nodes, and ~~for carrying to carry~~ the optical signal including the test optical signal from ~~[[said]]~~ the source node to ~~[[said]]~~ the destination node via intermediate nodes; and

an optical loop-back circuit, ~~[[for]]~~ to perform looping back of the optical signal including the test optical signal at ~~anyone~~ any one of ~~[[said n]]~~ the nodes to ~~[[n]]~~ a preceding node without converting the optical signal including the test optical signal to an electrical signal.

16. (Currently Amended) An optical line terminal comprising:

~~a line interface having a line side transmit port for transmit port for transmitting an optical signal and a line side receive port for receiving to receive~~ an optical signal, including a test optical signal, that originated from an originating optical node;

a line interface having a line side transmit port to transmit the optical signal, including the test optical signal, back to the originating node;

at least one transponder having a transmit output terminal ~~for transmitting an optical signal~~ and a receive input terminal ~~for receiving an optical signal~~;
and

at least one optical switch having four terminals, with [[the]] a first terminal connected to the line side receive port and [[the]] a second terminal connected to the line side transmit port of [[said]] the line interface, and [[the]] a third terminal connected to the receive input terminal and [[the]] a fourth terminal connected to the transmit output terminal of [[said]] the transponder, [[said one]] the optical switch having a normal state in which a first optical path is provided from the first terminal to the third terminal of [[said one]] the optical switch to provide an optical connection from the line side receive port of [[said]] the line interface to the receive input terminal of [[said]] the transponder, and a second optical path is provided from the second terminal to the fourth terminal of [[said]] the optical switch to provide an optical connection from the transmit output terminal [[port]] of [[said]] the transponder to the line side transmit port of [[said]] the line side interface, [[said one]] the optical switch having a loopback state in which a third optical path is provided from the first terminal to the second terminal of [[said one]] the optical switch to loopback the optical signal including the test optical signal received at the line side receive port to the line side transmit port of [[said]] the line interface, and a fourth optical path is provided from the third terminal to the fourth terminal of [[said one]] the optical switch to loopback the optical signal including the test optical signal transmitted from the transmit output terminal to the receive input terminal of [[said]] the transponder, wherein while in the loopback state, the optical switch does not convert the optical signal, including the test optical signal, to electrical form.

17. (Currently Amended) An optical line terminal comprising:

~~a line interface having a line side transmit port for transmitting an optical signal and a line side receive port for receiving to receive an optical signal, including a test optical signal, that originated from an originating optical node;~~

a line interface having a line side transmit port to transmit the optical signal, including the test optical signal, back to the originating node;

at least one transponder having a transmit output terminal ~~for transmitting an optical signal~~ and a receive input terminal ~~for receiving an optical signal~~; and

at least one optical switch ~~[[for]]~~ to perform at least one of looping back the optical signal, including the test optical signal, received at the line side receive port to the line side transmit port of ~~[[said]]~~ the line side interface, and ~~[[for]]~~ looping back the optical signal, including the test optical signal, transmitted from the transmit output terminal to the receive input terminal of ~~[[said]]~~ the transponder, ~~[[said]]~~ the optical switch having first and second switch terminals connected to the line side transmit port and line side receive port, respectively, of ~~[[said]]~~ the line interface, and having third and fourth switch terminals connected to the transmit output terminal and the receive input terminal, respectively, of ~~[[said]]~~ the transponder, wherein when performing looping back, the optical switch does not convert the optical signal, including the test optical signal, to electrical form.

18-29. (Cancelled)

30. (Currently Amended) An optical line terminal, comprising:
a line interface having a line side transmit port to transmit an optical
signal and a line side receive port to receive an optical signal;
a port side interface having a port side transmit port to transmit an
optical signal and a port side receive port to receive an optical signal;
and a transponder connected to the line side transmit port and the
line side receive port of the line side interface, and also connected to the port side transmit
port and port side receive port of the port side interface, the transponder including a
loopback mechanism to perform one of looping back of the received optical signal at the
line side receive port to the line side transmit port and looping back of the received optical
signal at the port side receive port to the port side transmit port.

~~The optical line terminal of claim 12;~~ wherein the loopback mechanism comprises:

a first switch connected to switch the received optical signal at the line side receive port between a first path leading to the port side transmit port and a second path leading to the line side transmit port;

a second switch connected to select between the second path and a third path leading from the port side receive port and to provide an output leading to the line side transmit port;

a third switch connected to select between the first path and a fourth path leading from the port side receive port and to provide an output leading to the port side transmit port; and

a fourth switch connected to switch the received optical signal at the port side receive port between the third path leading to the line side receive port and the fourth path leading to the port side transmit port.

31. (Currently Amended) An optical line terminal, comprising:

a line interface having a line side transmit port to transmit an optical signal and a line side receive port to receive an optical signal;

a port side interface having a port side transmit port to transmit an optical signal and a port side receive port to receive an optical signal;

a transponder connected to the line side transmit port and the line side receive port of the line side interface, and also connected to the port side transmit port and port side receive port of the port side interface, the transponder including a loopback mechanism to perform one of looping back the received optical signal at the line side receive port to the line side transmit port and looping back the received optical signal at the port side receive port to the port side transmit port; and

~~The optical line terminal of claim 12, further comprising a~~
multiplexer/demultiplexer connected between the transponder and the port side transmit and receive ports.

32. (Currently Amended) The optical node of claim 13, further comprising:

a second line side transmit interface ~~for transmitting~~ to transmit one or more of a plurality of optical wavelengths; and

an associated second line side receive interface ~~for receiving~~ to receive one or more of a plurality of optical wavelengths,

wherein the loopback mechanism is operable to loop back one or more of the plurality of optical wavelengths received at the second line side receive interface to the second line side transmit interface without converting the optical wavelengths to electrical form.

33. (Previously Presented) The optical node of claim 32, wherein the loopback mechanism comprises a 2x2 optical switch having a first input port connected to receive at least one of the optical wavelengths received at the line side receive interface, the optical switch being adapted to output the received optical wavelength from a first output port to the line side transmit port or from a second output port, the optical switch further having a second input port.

34. (Currently Amended) An optical node comprising:

a line side transmit interface to transmit one or more of a plurality of optical wavelengths;

an associated line side receive interface to receive one or more of a plurality of optical wavelengths;

a loopback mechanism to perform looping back of one or more of the plurality of optical wavelengths received at the line side receive interface to the line side transmit interface without converting the optical wavelengths to electrical form;

a second line side transmit interface to transmit one or more of a plurality of optical wavelengths;

an associated second line side receive interface to receive one or more of a plurality of optical wavelengths; and

~~The optical node of claim 33, further comprising a~~
multiplexer/demultiplexer connected between the line side transmit and receive ports and
the 2x2 optical ~~switch~~: switch.

wherein the loopback mechanism is operable to loop back one or more of the plurality of optical wavelengths received at the second line side receive interface to the second line side transmit interface without converting the optical wavelengths to electrical form and the loopback mechanism comprises a 2x2 optical switch having a first input port connected to receive at least one of the optical wavelengths received at the line side receive interface, the optical switch being adapted to output the received optical wavelength from a first output port to the line side transmit port or from a second output port, the optical switch further having a second input port.

35. (Previously Presented) The optical node of claim 33, wherein the loopback mechanism further comprises a second 2x2 optical switch having a first input port connected to receive at least one of the optical wavelengths received at the second line side receive interface, the second optical switch being adapted to output the received optical wavelength from a first output port to the second line side transmit port or from a second output port, the second optical switch further having a second input port.

36. (Currently Amended) An optical node comprising:
a line side transmit interface to transmit one or more of a plurality of
optical wavelengths;
an associated line side receive interface to receive one or more of a
plurality of optical wavelengths;
a loopback mechanism to perform looping back of one or more of
the plurality of optical wavelengths received at the line side receive interface to the line
side transmit interface without converting the optical wavelengths to electrical form,
a second line side transmit interface to transmit one or more of a
plurality of optical wavelengths;
an associated second line side receive interface to receive one or
more of a plurality of optical wavelengths;
wherein the loopback mechanism is operable to loop back one or
more of the plurality of optical wavelengths received at the second line side receive

interface to the second line side transmit interface without converting the optical wavelengths to electrical form, and

wherein the loopback mechanism comprises a first 2x2 optical switch having a first input port connected to receive at least one of the optical wavelengths received at the line side receive interface, the first optical switch being adapted to output the received optical wavelength from a first output port to the line side transmit port or from a second output port, the first optical switch further having a second input port, wherein the loopback mechanism further comprises a second 2x2 optical switch having a first input port connected to receive at least one of the optical wavelengths received at the second line side receive interface, the second optical switch being adapted to output the received optical wavelength from a first output port to the second line side transmit port or from a second output port, the second optical switch further having a second input port, and

The optical node of claim 35, further comprising wherein the optical node further comprises a second multiplexer/demultiplexer connected between the second line side transmit and receive ports and the second 2x2 optical switch.

37. (Previously Presented) The optical node of claim 13, wherein the loopback mechanism comprises a 2x2 optical switch having a first input port connected to receive at least one of the optical wavelengths received at the line side receive interface, the optical switch being adapted to output the received optical wavelength from a first output

port to the line side transmit port or from a second output port, the optical switch further having a second input port.

38. (Currently Amended) The optical network of claim 15, further comprising:

a line side transmit interface ~~for transmitting to~~ transmit one or more of a plurality of optical wavelengths to the optical nodes;

an associated line side receive interface ~~for receiving to~~ receive one or more of a plurality of optical wavelengths from the optical nodes;

a second line side transmit interface ~~for transmitting to~~ transmit one or more of a plurality of optical wavelengths to the optical nodes; and

an associated second line side receive interface ~~for receiving to~~ receive one or more of a plurality of optical wavelengths from the optical nodes,

wherein the optical loop-back circuit comprises a 2x2 optical switch having a first input port connected to receive at least one of the optical wavelengths received at the line side receive interface, the optical switch being adapted to output the received optical wavelength from a first output port to the line side transmit port or from a second output port, the optical switch further having a second input port.

39. (Previously Presented) The optical network of claim 38, wherein the optical loop-back circuit further comprises a second 2x2 optical switch having a first input

port connected to receive at least one of the optical wavelengths received at the second line side receive interface, the second optical switch being adapted to output the received optical wavelength from a first output port to the second line side transmit port or from a second output port, the second optical switch further having a second input port.